Wireless LAN Controllers (WLC) Hardware Installation Guide

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About This Guide

This guide provides information on how to install a Juniper Networks Wireless Lan Controller (WLC) in a Juniper Networks System and deploy basic IEEE 802.11 wireless service. This guide is intended for network administrators or other persons involved in installing WLCs and deploying 802.11 wireless service in a network.

The Juniper Networks Mobility System

The Juniper Networks is an enterprise-class WLAN solution that seamlessly integrates with an existing wired enterprise network. The Juniper Networks system provides secure connectivity to both wireless and wired users in large environments such as office buildings, hospitals, and university campuses and in small environments such as branch offices.

The Juniper Networks Mobility System fulfills the three fundamental requirements of an enterprise WLAN: It eliminates the distinction between wired and wireless networks, allows users to work safely from anywhere (*secure mobility*), and provides a comprehensive suite of intuitive tools for planning and managing the network before and after deployment, greatly easing the operational burden on IT resources.

Juniper Networks Mobility System Publications

The Juniper Networks Mobility System consists of the following components:

- **RingMaster tool suite**—A full-featured graphical user interface (GUI) application used to plan, configure, deploy, and manage a WLAN and its users
- **One or more WLCs™ (WLC™)** —Distributed, intelligent controllers for managing user connectivity, connecting and powering Wireless Lan Controller APs, and connecting the WLAN to the wired network backbone
- **Wireless LAN Access Points (WLAs)™** —Wireless access points that transmit and receive radio frequency (RF) signals to and from wireless users and connect them to an WLC
- **Mobility System Software™ (MSS™)**—The operating system that runs all WLCs and access points in a WLAN, and is accessible through a command-line interface (CLI), the Web View interface, or the RingMaster GUI

Documentation

Consult the following documents to plan, install, configure, and manage a Juniper Networks Mobility System.

You can find product documentation at: http://www.juniper.net/techpubs/en_US/release-independent/wireless/information-products/pathway-pages/wireless-lan/index.html.

Planning, Configuration, and Deployment

- *RingMaster Configuration Guide* — This guide provides instructions for planning, configuring, deploying, and managing the entire WLAN with the RingMaster tool suite. Read this guide to learn how to plan wireless services, how to configure and deploy Juniper Networks equipment to provide those services, and how to optimize and manage your WLAN.
- *RingMaster Planning Guide*— This guide provides detailed instructions and information for all RingMaster planning, configuration, and management features.

Installation

- *Wireless LAN Controllers (WLC) Hardware Installation Guide* (this document) — This guide provides instructions and specifications for installing an WLC.

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- *Mobility System Software Quick Start Guide* — This guide provides instructions for performing basic setup of secure (802.1X) and guest (WebAAA™) access, and for configuring a Mobility Domain for roaming. See the guide at: http://www.juniper.net/techpubs/en_US/release-independent/wireless/information-products/pathway-pages/wireless-lan/software-80.html.
- *Regulatory Information* — For detailed compliance information see the *Juniper Networks Regulatory Guide* located at: www.juniper.net/techpubs/en_US/release-independent/wireless/information-products/topic-collections/wireless-lan/hardware/regulatory-info.pdf. The guide can be downloaded in PDF format.
- *RingMaster 8.0 Quick Start Guide* — This guide provides a description of prerequisites and procedures required to install and begin using RingMaster 8.0 software. Information is provided about system requirements for optimum performance, as well as how to install RingMaster Client and RingMaster Services software.

Configuration and Management

- *RingMaster Configuration Guide* — This guide provides instructions for planning, configuring, deploying, and managing the entire WLAN with the RingMaster tool suite. Read this guide to learn how to plan wireless services, how to configure and deploy Juniper Networks equipment to provide those services, and how to optimize and manage your WLAN.
- *RingMaster Management Guide* — This guide provides detailed instructions and information for all RingMaster planning, configuration, and management features.
- *Mobility System Software Configuration Guide* — This guide provides instructions for configuring and managing the system through the MSS CLI
- *Mobility System Software Command Reference* — Functional and alphabetic reference to all MSS commands supported on MXs and MP access points

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Juniper Networks Documentation Conventions

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This situation or condition can lead to data loss or damage to the product or other property.

This is a process or procedural tip or other useful suggestion.

This information you should note relevant to the current topic.

This alerts you to a possible risk of personal injury or major equipment problems.

Hypertext Links

Hypertext links appear in Blue.

As an example, this is a link to **Contacting the Technical Assistance Center**.

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Juniper Networks guides use the following text and syntax conventions:

Convention	Use
Monospace text	Sets off command syntax or sample commands and system responses.
Bold text	Highlights commands that you enter or items you select.
Italic text	Designates command variables that you replace with appropriate values or highlights publication titles or words requiring special emphasis.
Bold italic text font	***Bold italic text font*** in narrative, capitalized or not, indicates a program name, function name, or string.
Menu Name > **Command**	Indicates a menu item. For example, **File** > **Exit** indicates that you select **Exit** from the **File** menu.
[ ] (square brackets)	Enclose optional parameters in command syntax.

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Convention	Use
{ } (curly brackets)	Enclose mandatory parameters in command syntax.
| (vertical bar)	Separates mutually exclusive options in command syntax.

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- Your name, phone number, cell phone or pager number, and e-mail address
- Name, model, and serial number of the product(s) requiring service
- Software version(s) and release number(s)
- Output of the ***show tech-support*** command
- Wireless client information
- License levels for RingMaster™ and Mobility Exchange™ (MX™) products
- Description of any problems and status of any troubleshooting effort

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WLC Overview

A Juniper Networks Wireless Lan Controller (WLC) in a Juniper Networks System provides mobility and authentication, authorization, and accounting (AAA) services for wireless or wired users. A WLC also controls the operation of Juniper Networks Wireless LAN Access Points (WLAs), which control and manage IEEE 802.11 operations

See the complete Wireless LAN Services (WLS) product documentation at:

http://www.juniper.net/techpubs/en_US/release-independent/wireless/information-products/pathway-pages/wireless-lan/index.html.

Installation must be performed by qualified service personnel only. Read and follow all warning notices and instructions marked on the product or included in the documentation. Before installing the product, read the *Regulatory Information* document.

There are no user-serviceable parts inside the WLCs.

WLC Model Numbers

Model	Port Configuration	Power Supply Configuration
WLC2800	Eight Gigabit Ethernet ports and two 10-Gigabit small form-factor pluggable transceiver ports (XFPs). The Gigabit Ethernet ports are copper/fiber dual-interface ports. You can use a 10/100/1000 base-T RJ-45 copper port or small form-factor pluggable (SFP) port for 1000BASE-SX/LX SFP transceiver. The 10- Gigabit Ethernet ports support XFP-short reach (SR) or long reach (LR) transceivers.	Two 100-240V volts alternating current (VAC) autosensing AC power supplies.
WLC880R	Four 10/100/1000 Ethernet ports with RJ-45 connectors and four Gigabit Ethernet fiber ports with SFP connectors for 1000Base-SX/LX connectivity. No Power over Ethernet (PoE)/ power sourcing equipment (PSE) functionality.	Two 100-240 VAC autosensing AC power supplies.
WLC800	Four 10/100/1000 Ethernet ports with RJ-45 connectors and four Gigabit Ethernet fiber ports with SFP connectors for1000Base-SX/LX connectivity. No PoE/PSE functionality.	Two 100-240 VAC autosensing AC power supplies.
WLC200	Two Gigabit Ethernet ports. Each port has a SFP slot for insertion of a SFP 1000BASE-SX or 1000BASE-LX fiber-optic interface. One 10/100 Ethernet port for out-of-band management (without PoE).	Two 100-240V VAC autosensing AC power supplies.
WLC8	Eight 10/100 Ethernet ports, six of which support PoE.	One 100-120 VAC / 200-240 VAC autosensing AC power supply.
WLC2	Two 10/100BASE-TX Ethernet ports Port 1 provides an uplink to the network. Port 2 supports PoE and provides direct connection to an APs.	One 100-240 VAC autosensing AC power supply.

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Hardware Features

WLC2800

The WLC2800 is designed for data center or distributed wiring closet installations, the WLC2800 enables seamless and secure deployment of enterprise class wireless networks over any existing L2/L3 network without disruption.

Figure 1–1. WLC2800 — Front View

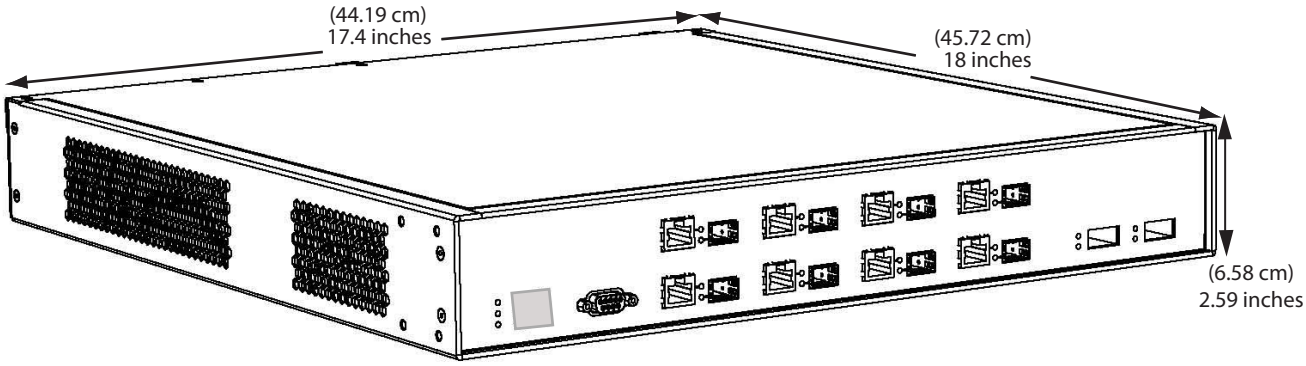
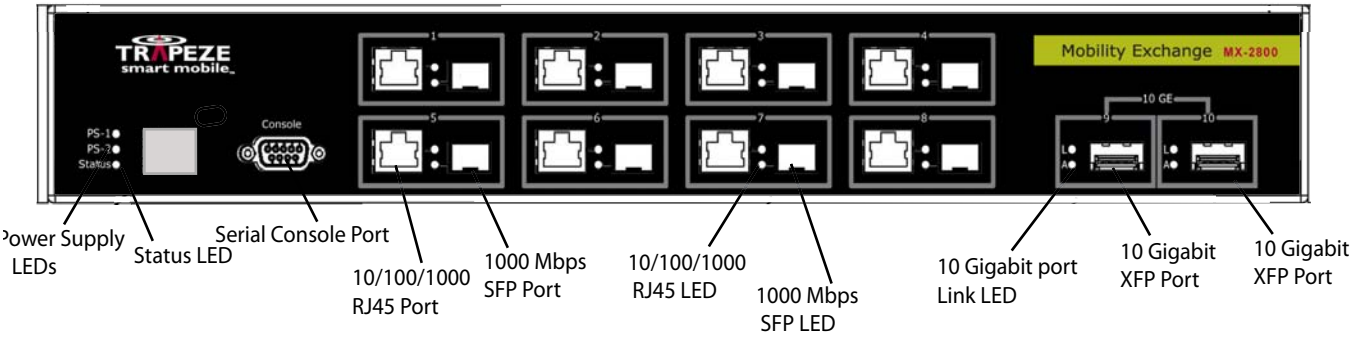


Figure 1–2. MX-2800 — Front Panel Control Features



The above figure shows the external hardware features of an WLC2800. The WLC2800 has eight 10/100/1000 RJ45 Ports and eight 1000 Mbps SFP Ports.

The out-of-band serial console port on the WLC2800 is not functional after the unit has booted.

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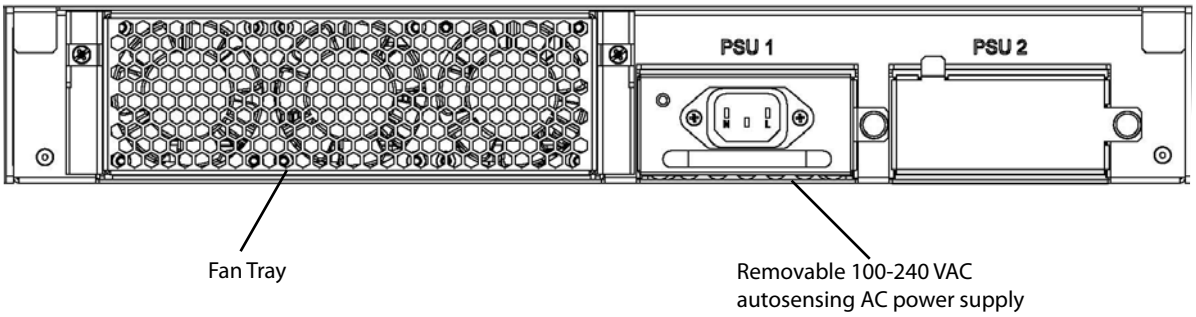
Figure 1–3. WLC2800 — Rear Control Features



The rear of the WLC2800 contains a removable fan tray and removable 100-240 VAC autosensing AC power supply. An WLC2800 comes with one 100-240 VAC autosensing AC power supply. You can add a second supply for load sharing and redundancy. The power supplies are hot-swappable but the fan tray unit should not be replaced while the unit is on.

WLC880R

The WLC880R is designed for medium size remote office WLAN deployments. WLC880R is a dedicated 1.5 Ghz hardware platform that provides four 10/100/1000 Mbps Ethernet (RJ-45) ports and four Gigabit Ethernet SFP ports. These ports do not provide Power-over-Ethernet (PoE) capabilities. The WLC880R has a base AP license of 16 APs, and can be incremented with additional 16 AP license blocks that can accumulate up to 256 AP licenses per WLC880R. An WLC880R is one rack unit high and can be installed in a standard 48.26-centimeters (19-inch) equipment rack or on a tabletop.

Figure 1–4. WLC880R — Front and Side Panel Control Features

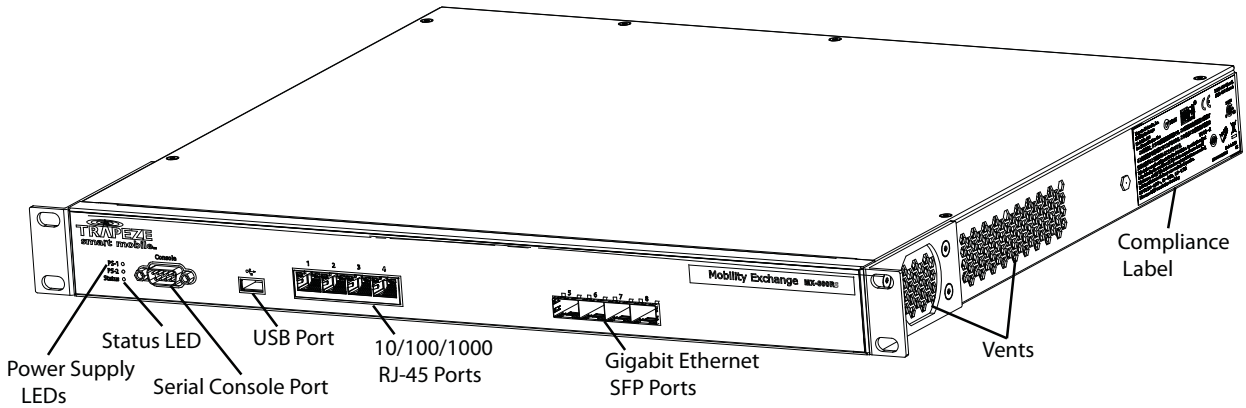


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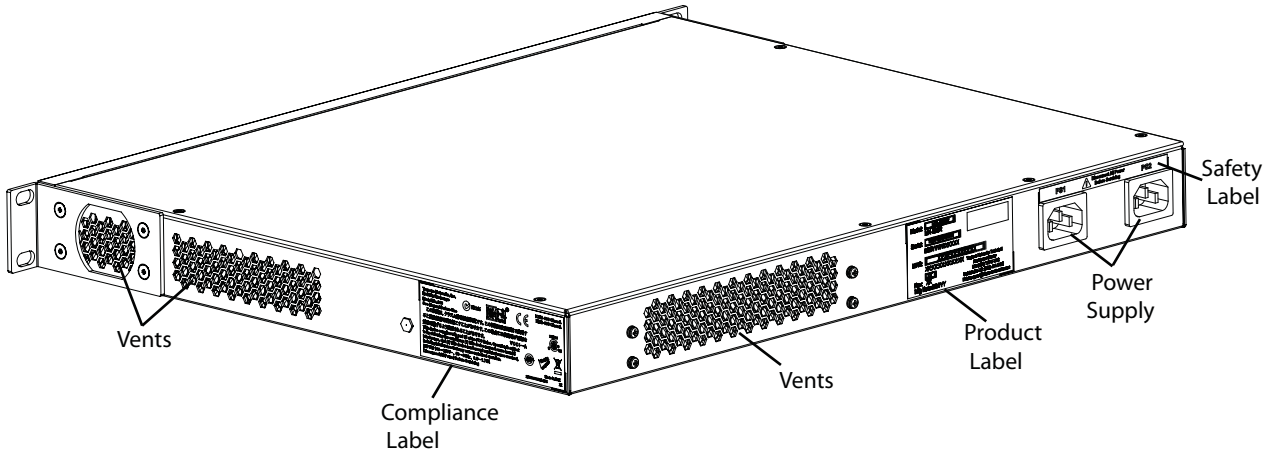
Figure 1–5. WLC880R- Side and Rear Panel Control Features



WLC800

The WLC800 is designed for medium size WLAN deployments. WLC800 is a dedicated hardware platform that provides four 10/100/1000 Mbps Ethernet (RJ-45) ports and four Gigabit Ethernet SFP ports. These ports will not provide PoE capabilities. The WLC800 has a base AP license of 16 access points, but can support up to 128 APs with 16 additional AP license blocks. An WLC800 is one rack unit high and can be installed in a standard 48.26-centimeters (19-inch) equipment rack or on a tabletop.

Figure 1–6. WLC800 — Front and Side Panel Control Features

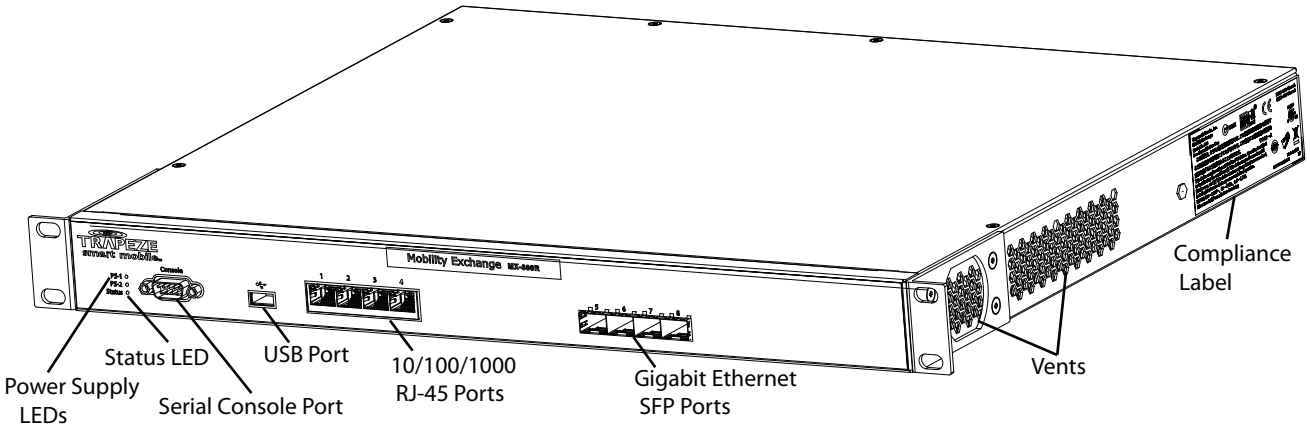


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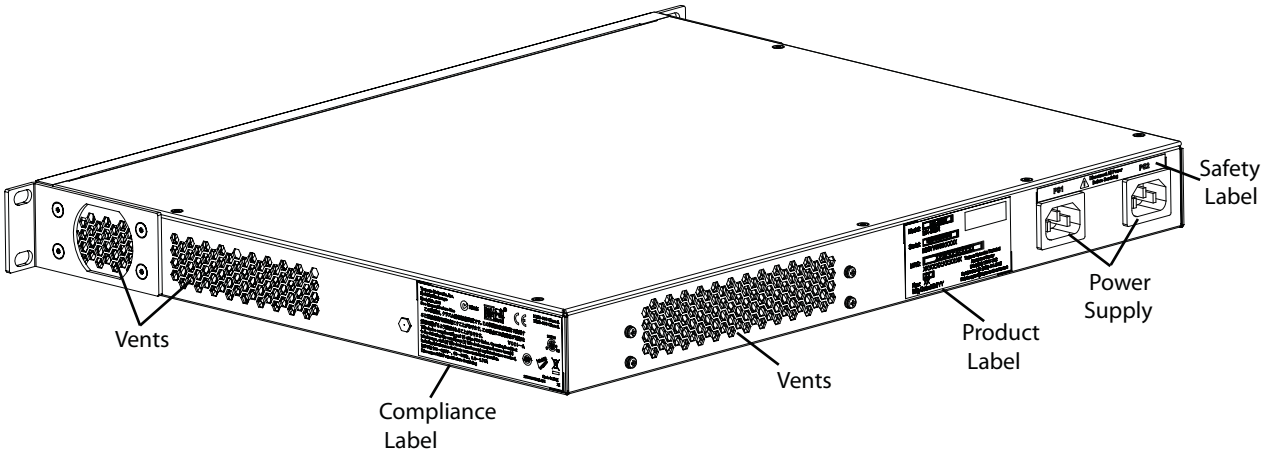
Figure 1–7. WLC800 — Side and Rear Panel Control Features



WLC200

An WLC200 is one rack unit high and also can be installed in a standard 48.26-centimeters (19-inch) equipment rack or on a tabletop. The figure below shows a front view of an WLC200.

Figure 1–8. WLC200 — Front View

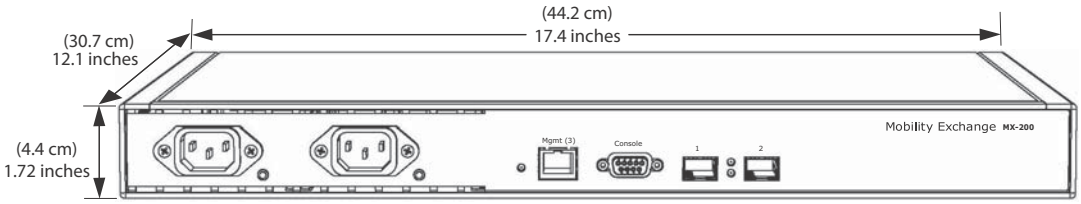
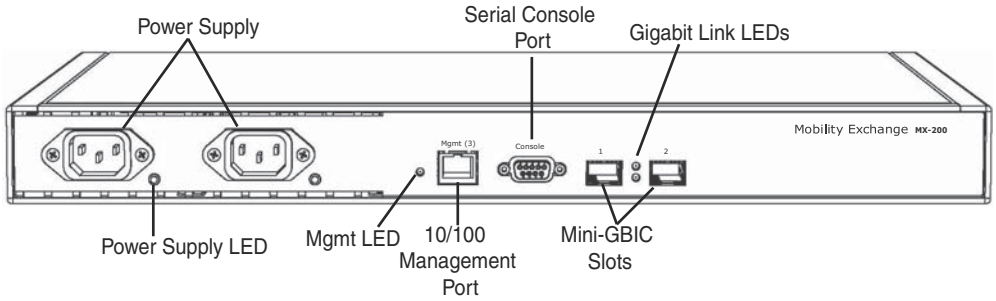


Figure 1–9. WLC200 — Front Panel Control Features



The rear of the WLC contains a label with the serial ID, MAC address, and other identifying information.

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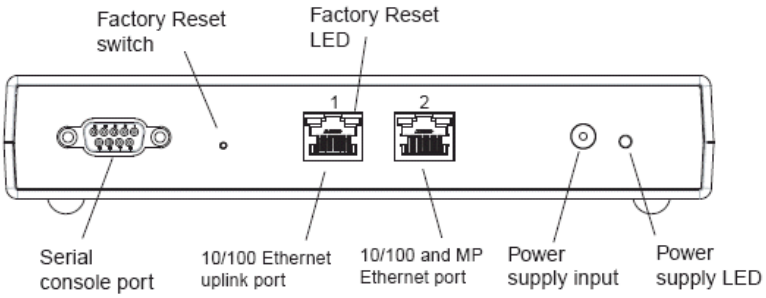
WLC2

An WLC is compact and can be installed on a tabletop. The figure below shows a front view and the external hardware features of an WLC2.

Figure 1–10. WLC2 — Front View



Do not stack WLC2s. Stacked WLC2s can overheat and cause loss of equipment functionality or permanent damage.

Ensure adequate airflow around WLC2s. The WLC2 uses natural convection cooling and requires free entry of air. Airflow blockage can cause the system to overheat and result in a loss of equipment functionality or permanent damage.

WLC8

An WLC8 is one rack unit high and also can be installed in a standard 48.26-centimeters (19-inch) equipment rack or on a tabletop. The figure below shows a front view of an WLC8.

Figure 1–11. Juniper Networks WLC8—Front View

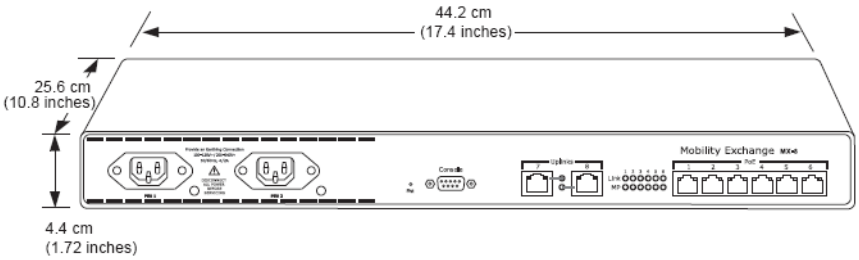


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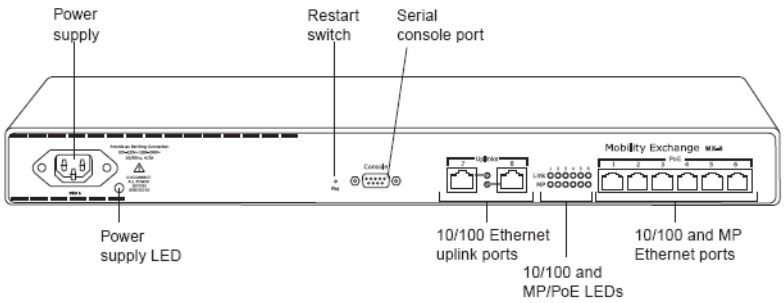
Figure 1–12. WLC8—Front Panel Control Features



The rear of the WLC8 contains a label with the serial ID, MAC address, and other identifying information.

Management Features

- Serial console port—The serial console port provides a direct management connection to an MX command-line interface (CLI). The port has a DB-9 female connector and supports the EIA-232D signaling standard. (
  - The out-of-band serial console port on the WLC2800 is not functional after the unit has booted.
  - There is no requirement for a dedicated management port on the WLC800 or WLC880R. Any of the 8 ports can be used for this function. There is no external dedicated debug port.
- 10/100 out-of-band management port—The WLC200 features an out-of-band management port, which allows you to connect the WLC to a network server and configure it to boot using a software image downloaded from the server. The WLC2 also supports booting with a software image downloaded from a server.
- Restart WLC—The restart switch allows you to restart an WLC8 without removing the power cord(s).

The reset switch on the WLC2 performs two functions. If you press the reset switch for less than 5 seconds, it restarts the WLC2 and reloads its configuration from the configuration file. **However, if you press the switch for 5 seconds or longer, the configuration file is deleted and the switch restarts with its factory default settings.** If you accidentally press the factory reset switch for too long and erase the configuration, you can use the Web Quick Start to reconfigure the WLC.

- Status LEDs—The Ethernet ports and power supplies on all models have LEDs that indicate their status. The management CPU on an WLC200 and WLC2800 also has an LED. (For details, see **“Status LEDs” on page 1–9**.)

Power Features

- An WLC2800 comes with one 100-240 VAC autosensing AC power supply. You can add a second supply for load sharing and redundancy. The power supplies are hot-swappable.
- The WLC800 and WLC880R have two built-in 100-240VAC auto ranging power supplies for redundancy.
- An WLC8 contains either one or two 100-120 VAC / 200-240 VAC autosensing AC power supplies. The WLC8 power supplies are fixed-configuration supplies and cannot be inserted or removed.

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- An WLC200 contains two 100-240V VAC autosensing AC power supplies.
- An WLC2 uses an external power supply, which comes with the WLC.

Network Interfaces

SFP slots for the WLC200 and WLC2800

WLC200

- The WLC200 has two slots allowing insertion of small form-factor pluggable (SFP) 1000BASE-SX or 1000BASE-LX fiber-optic SFPs to provide gigabit Ethernet interfaces to the network.
- The SFPs have standard SC Duplex connectors and use either single-mode fiber (SMF) for LX or multimode fiber (MMF) for SX. SFPs are available separately and are not included with the WLC.
- The gigabit Ethernet ports operate at 1000 Mbps only. They do not change speed to match 10-Mbps or 100-Mbps links.

- **WLC2800**
  - An WLC2800 has eight dual mode 10/100/1000 RJ-45 or 1000 Mbps fiber ports (these ports allow insertion of SFP transceivers). There are also two 10-Gigabit (XFP) ports located on the far right of the WLC. The WLC2800 only supports fiber SFPs in ports 1 through 8.

Always use only Juniper Networks-qualified SFPs and XFPs. For a list of compatible SFPs and XFPs please refer to the Juniper Networks Pricelist at: http://www.juniper.net/.

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Status LEDs

The WLCs have LEDs that indicate port, power, and CPU status.

WLC8, WLC200, WLC800, WLC880R and WLC2800 LEDs.

Table 1– 1. WLC Status LEDs— WLC8, WLC200, WLC800, WLC880R and WLCWLC2800

LED	Appearance	Meaning
Mgmt WLC200, WLC800, WLC880R and WLC2800 only)	Bright green, then fade (repeated) **Note:** This LED appearance is sometimes called *breathing*.	WLC is operating normally.
	Blinking green	WLC is booting.
	Quickly blinking amber	WLC was unable to boot completely.
Power supply status	Solid green	DC power output is on.
	Solid amber	Power fault has occurred.
	Unlit	AC power is off.
Gigabit fiber link activity (WLC200 only)	Solid green	1000-Mbps fiber link is operational.
	Blinking amber	Traffic is active on the 1000-Mbps fiber link.
	Blinking green (WLC200)	Traffic is active on the 1000-Mbps fiber link.
Gigabit fiber link activity WLC2800 WLC800, WLC880R and WLC800 only	Blinking green	1000-Mbps fiber link is operational.
Gigabit copper link activity (WLC200, WLC800, WLC880R and WLC2800 only)	Solid green	1000-Mbps copper link is operational.
	Blinking green	Traffic is active on the 1000-Mbps copper link.
Link (WLC8 only)	Solid green	100-Mbps link is operational.
	Solid amber	10-Mbps link is operational.
	Blinking green	Traffic is active on the 100-Mbps link.
	Blinking amber	Traffic is active on the 10-Mbps link.
Activity LEDS for 10 Gigabit port WLC2800	Blinking green	Traffic is active on the 10 Gigabit port.
Link LEDs for 10 Gigabit port WLC2800	Solid green	10 Gigabit link is operational
	Solid Amber	Admin down.
	Unlit	AC power is off.

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Table 1– 1. WLC Status LEDs— WLC8, WLC200, WLC800, WLC880R and WLCWLC2800

LED	Appearance	Meaning
AP (WLC8 only)	Solid green	For an AP's active link, with PoE enabled, all the following are true: ❑ AP has booted. ❑ AP has received a valid configuration from the WLC. ❑ Management link with an APis operational.
	Alternating green and amber	AP is booting with an image received from the WLC. If the LED remains in this state indefinitely, the boot or configuration attempt has failed.
	Solid amber	PoE is on but no AP is connected to the link.
	Blinking amber	AP is not connected or is unresponsive, or there is a PoE problem.
	Unlit	Port is not configured as an AP access port, or PoE is off.

WLC2 LEDs

The figure below shows the locations of the WLC2 LEDs. Table 1– 2 describes the LEDs behavior.

Figure 1–13. WLC2 LEDs

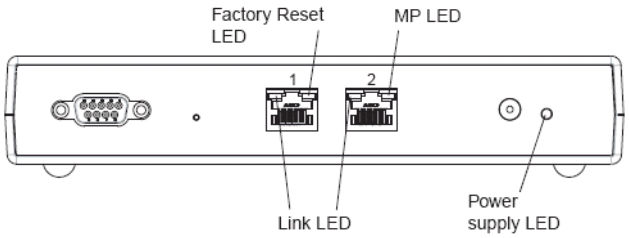

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Table 1– 2. WLC Status LEDs—WLC2

LED	Appearance	Meaning
Power status	Solid green	The WLC is receiving power.
	Unlit	The WLC is not receiving power.
Link (ports 1 and 2)	Solid green	100-Mbps link is operational.
	Solid amber	10-Mbps link is operational.
	Blinking green	Traffic is active on the 100-Mbps link.
	Blinking amber	Traffic is active on the 10-Mbps link.
Factory Reset (port 1 only)	Solid green	The WLC is booting and is loading the configuration file. This LED state lasts for three seconds.
	Blinking green	The WLC is booting but the factory reset switch is being pressed. The WLC does not load the configuration file but instead contacts RingMaster to request a configuration. This LED state lasts for three seconds.
	Unlit	The WLC has finished booting.
AP (port 2 only)	Solid green	For an AP's active link, with PoE enabled, all the following are true: ❑ AP has booted. ❑ AP has received a valid configuration from the WLC. ❑ Management link with an AP is operational.
	Alternating green and amber	AP is booting with an image received from the WLC. If the LED remains in this state indefinitely, the boot or configuration attempt has failed.
	Solid amber	PoE is on but no AP access point is connected to the link.
	Blinking amber	AP is not connected or is unresponsive, or there is a PoE problem.
	Unlit	Port is not configured as an AP access port, or PoE is off.

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Installing and Connecting an WLC

Note: Before installing an WLC, you might need to generate a network plan with RingMaster.

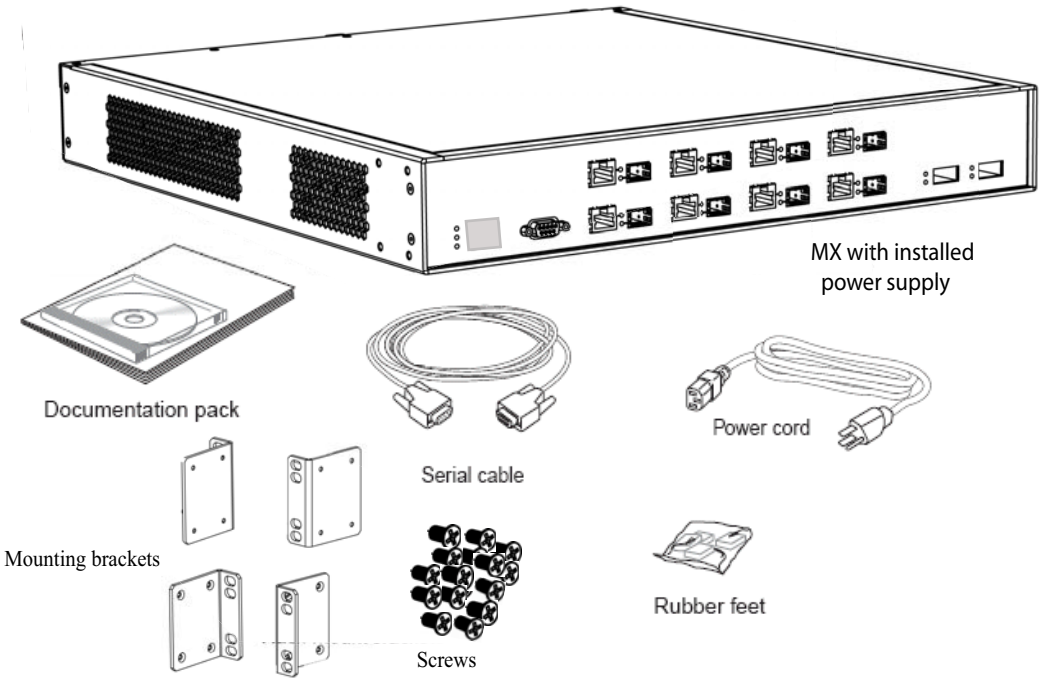
Unpacking an WLC

The shipping carton for an WLC contains the following items:

- One WLC, with one power supply (or two power supplies, if you ordered the WLC8)
- For some countries, one country-specific power cord
- One serial cable for connection to the management console (not included with the WLC2)
- Two rack-mount brackets (not applicable to the WLC2)
- Four adhesive rubber feet
- One documentation pack that includes this guide
- One set of release notes

Figure 2–1 shows the contents of the shipping carton for an WLC2800, WLC800, WLC880R, WLC200, WLC8, and WLC2.

Figure 2–1. WLC2800 Shipping Carton Contents



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Before you begin installation:

1. Open the carton and carefully remove the contents.
2. Place the packing materials back in the carton and save the carton.
3. Verify that you received each item in the previous list. If any item is missing or damaged, contact Juniper Networks.

Installation Requirements and Recommendations

For best results, follow these requirements and recommendations before installing an MX.

RingMaster Network Plan

If you are using RingMaster to plan your Juniper Networks Mobility System installation, create and verify a network plan for the entire Juniper Networks installation before installing WLCs or WLAs. A network plan provides the following information:

- ❑ Number of WLCs required at your site, and where to install them
- ❑ Number of WLAs required for adequate WLAN capacity in each coverage area, and where to install them
- ❑ Configuration settings for all the WLCs and WLAs in the WLAN, which can be automatically deployed to the devices by RingMaster.

(For information about installing RingMaster and creating and verifying a network plan, see the *RingMaster User's Guide*.)

Installation Location

The WLC has been designed and tested to be installed in an operating ambient temperature of 0° C to +50° C (32° F to 122° F). To reduce the risk of equipment damage, install equipment with consideration to these ambient conditions.

Do not stack WLC2s. Stacked WLC2s can overheat and cause loss of equipment functionality or permanent damage.

Ensure adequate airflow around WLC2s. TheWLC2 uses natural convection cooling and requires free entry of air. Airflow blockage can cause the system to overheat and result in a loss of equipment functionality or permanent damage.

WLC8, WLC200, and WLC2800 fans are located in the rear of the WLC and air inlets are located on the sides. In the WLC800 and WLC2800, three non-removable, non-field replaceable fans are located in the rear of the WLC and the air inlets are located in the side and rear of the unit. Always make sure these areas have adequate ventilation after installation. Do not block air vents.

Cabling Requirements

The gigabit Ethernet fiber-optic interfaces use Class 1 lasers. To reduce the risk of eye injury, do not stare into the interface or otherwise direct the laser beam into your eye.
The PoE and its associated LAN connections shall be interconnected only with equipment within the same building.

To avoid installation problems, use the proper cables.

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Network Cables

The following table lists the interface types supported by WLCs and the cable type required for each type of interface.

Table 2– 1. Ethernet Interfaces

Link Type	Cable Type	Connector Type
10/100/1000 BASE-TX	Cat 5 copper Straight-through or crossover signaling	RJ-45
1000BASE-SX	Multimode 50-µm fiber	SC/LC
	Multimode 62.5-µm fiber	SC/LC
1000BASE-LX	Single mode 9/10-µm fiber	SC/LC
	Multimode 50-µm fiber	SC/LC
	Multimode 62.5-µm fiber	SC/LC
10/100/1000 BASE-T	Cat 5E copper Can use straight-through or crossover signaling, provided all four wire pairs are connected	RJ-45
10GBASE-SR	Multimode 50-µm fiber	XFP
	Multimode 62.5-µm fiber	XFP
10GBASE-LR	Single mode 9/10-µm fiber	XFP

10/100 Ethernet Cabling

Connections on the 10/100 ports require Category 5 (Cat 5) cable based on the EIA/TIA-586 standard. For direct connection to a WLA, a router, or an end station such as a PC, printer, or server, use a straight-through cable. For direct connection to another WLC, use a crossover cable. The 10/100 Ethernet ports on the WLC8, WLC2 and WLC200s provide automatic MDI/MDX, which automatically crosses over the send and receive signals if required.

10/100/1000 Ethernet Cabling

For the WLC2800, WLC800 and WLC880R, connections on the 10/100/1000 ports require Category 5 Enhanced (Cat 5E) cable based on the EIA/TIA-586 standard and the SFP connector ports require fiber optic cable. The 10/100/1000 Ethernet ports provide automatic MDI/MDX, which automatically crosses over the send and receive signals if required.

MP Cable Requirement

Use a straight-through Ethernet cable to connect an MP directly to an WLC or indirectly through another device.

1000BASETX Gigabit Ethernet Cabling

Use Category 5 Enhanced (Cat 5E) or better cable. 1000BASE-TX uses all 8 wires in the cable. The wiring can be straight-through or crossover. The port automatically configures its pin signals accordingly.

PoE is not supported on 1000BASE-TX links. All wires in the cable are used for data.

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Installation Hardware and Tools

To reduce the risk of equipment damage, make sure the WLC is installed so that the mechanical load on the device is evenly distributed. For example, make sure the WLC is level in the equipment rack, evenly fastened by screws on either side, and does not have a heavy object resting on one side of the WLC.

The following table lists the mounting hardware and tools required for each type of installation.

Table 2– 2. Required Mounting Hardware and Tools

Mounting Option	Required Hardware and Tools	Included with the Product
Equipment rack 🗀 Front-mount	Mounting brackets	Yes
	Four rack-mount screws and screwdriver **Note:** Equipment racks vary, and the screw and screwdriver type depend on the equipment rack.	No
	Power cords	Yes (one)
	Serial console cable	Yes
Tabletop (applicable to all WLCs models)	Four adhesive rubber feet	Yes
	Power cord(s)	Yes
	Serial console cable	Yes

Installing an WLC

You can mount an WLC8, WLC200, WLC800, WLC880R and WLC2800 in a standard 48.26-centimeters (19-inch) equipment rack or on a tabletop. Each WLC is shipped with two brackets for rack mounting and four adhesive rubber feet for tabletop mounting. The WLC8, WLC200, WLC800, WLC880R and WLC2800 mounting brackets support front mounting only.

The WLC2 does not have rack mounting brackets but can be installed on a tabletop.

To install an WLC, use one of the following procedures.

Earth grounding is required for an WLC installed in a rack. If you are relying on the rack to provide ground, the rack itself must be grounded with a ground strap to the earth ground. Metal screws attaching the WLC to the rack provide ground attachment to the rack.

In the U.S., overcurrent protection must be provided by the installation. Branch circuit protection in accordance with National Fire Protection Association (NFPA) 70, National Electrical Code (NEC) is required. Consideration must be given to the electrical ratings on the WLC and branch circuit protection. Do not install equipment such that the branch circuit current and voltage protection is exceeded. Pay particular attention to the earthing connection for the supply connections. When using an extension cord or power strip, pay attention to the grounding type.

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Warning!

Do not stack WLC2s. Stacked WLC2s can overheat and cause loss of equipment functionality or permanent damage.

Ensure adequate airflow around WLC2s. The WLC2 uses natural convection cooling and requires free entry of air. Airflow blockage can cause the system to overheat and result in a loss of equipment functionality or permanent damage.

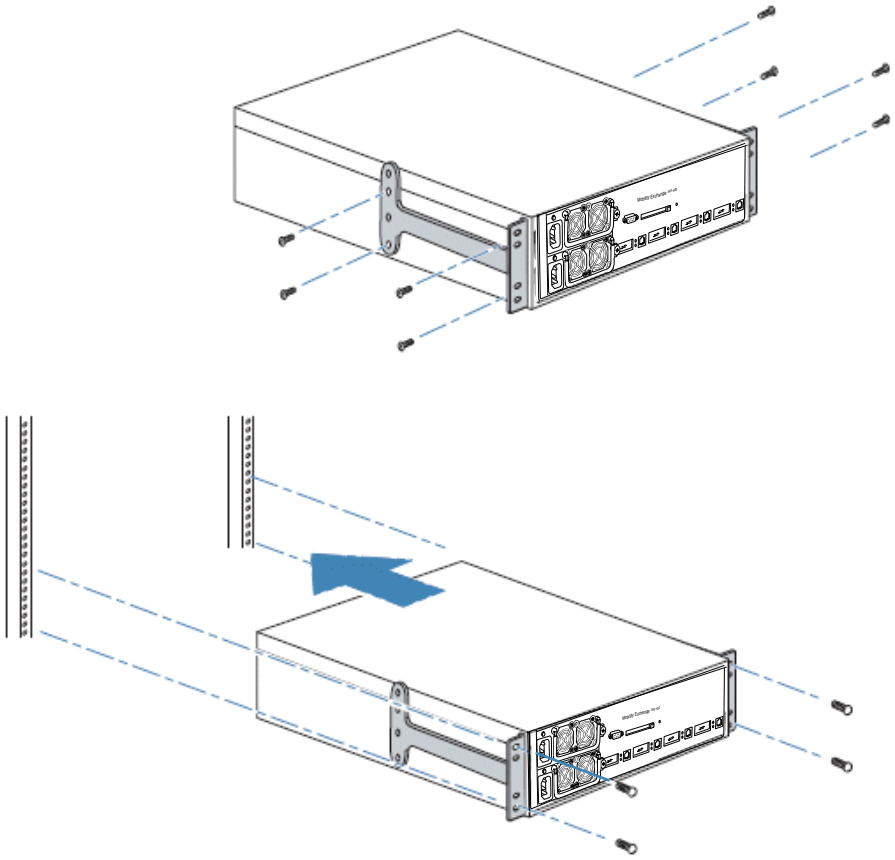
Equipment Rack Installation

You can install an WLC8, WLC200, WLC800, WLC880R or WLC2800 into a front-mount equipment rack.

- Figure 2–2 shows how to install an WLC8, WLC200, WLC800, WLC880R or WLC2800.

Refer to these figures as you perform the procedure.

Figure 2–2. WLC Front-Mount Installation on an Equipment Rack



1. Remove the four bracket screws from each side of the WLC.
2. Align a bracket over the screw holes:
   - For a front-mount equipment rack, align the bracket so that the bracket flange is flush with the WLC's front panel and extends away from the WLC.
   - For a center-mount equipment rack, align the bracket so that the bracket flange is located near the center screw holes.
3. Reinsert the screws to secure the brackets to the WLC.

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4. Repeat for the other bracket.

Juniper Networks recommends that you ask someone to assist you with the remaining steps. If you accidentally drop the WLC, you can be injured and the WLC can be damaged.

5. Lift the WLC into position in the equipment rack.

To prevent the WLC from slipping, do not release the WLC until all the rack-mount screws are tight.

6. Insert the bottom rack-mount screws into the bracket flanges to secure the WLC to the equipment rack, then insert the top screws.
7. Do one of the following:
8. If you are ready to turn on the power, go to **"Powering On an WLC"** .

Tabletop Installation

1. On a clean work surface with no debris, carefully turn the WLC upside down.
2. Wipe the four placement locations for the rubber feet to clear away any oil or dust. The location areas are marked by *X*'s.
3. Attach the four rubber adhesive feet over the *X*'s.
4. Turn the WLC right-side up, and place the WLC in position on the table.
5. If you are ready to turn on power, go to **"Powering On an WLC"** .

Installing a Power Supply in a WLC2800

WLC2800s are shipped with a single 100-240 VAC autosensing AC power supply. One power supply provides enough power for a fully configured system. You can add a second power supply for load sharing and redundancy. An WLC containing one power supply can have the supply installed in either slot. If the WLC contains two power supplies and one supply fails, the other supply automatically takes over to provide uninterrupted operation.

The power supplies are hot-swappable. You can remove or insert a power supply while the other power supply is running.

Use the following procedures to install a second power supply or replace a failed power supply.

To attach the power supply to an WLC2, see **"Powering On an WLC2"** .

The WLC2800 power supply is located on the rear of the machine.

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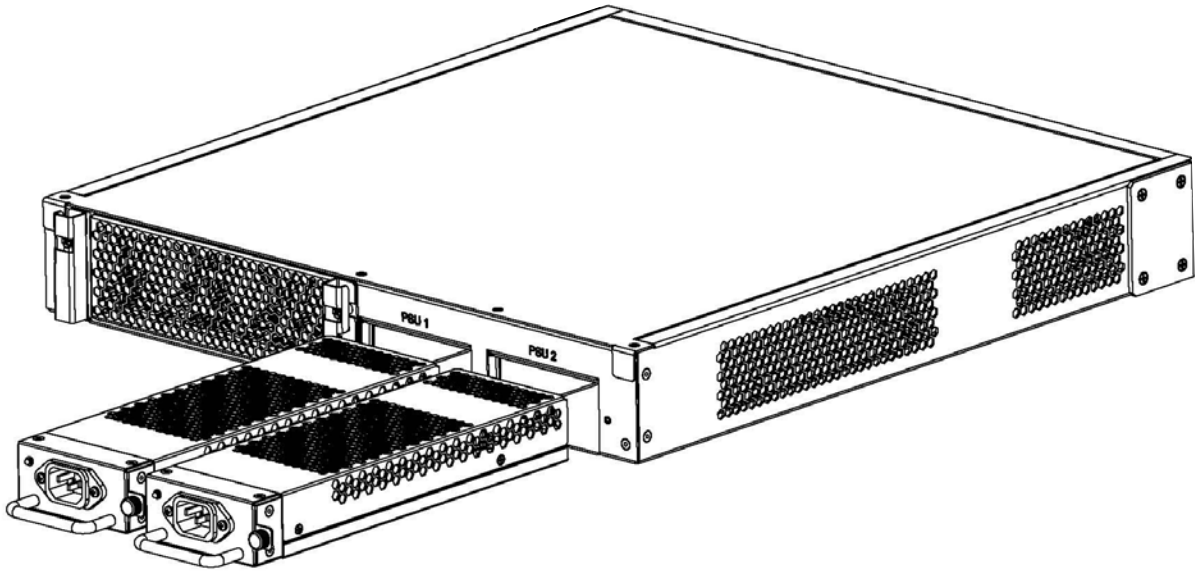
Installing a New Power Supply

1. If you are replacing a failed power supply and have not already removed it from the WLC, go to **"Replacing a Power Supply"** .
2. If you are installing a new power supply in an unused slot, loosen the thumbscrew with a #2 Phillips-head screwdriver and remove the cover plate.

   Store the cover plate in a safe place in case you need to use it at another time.
3. Remove the new power supply from the packaging and lift the power supply by grasping the front handle with one hand and supporting the power supply from the bottom with the other hand.
4. Insert the power supply into the WLC's slot as shown below, pushing gently but firmly until the power supply is fully seated and flush with the front panel of the WLC.

Figure 2–3. Inserting a Power Supply in an WLC2800 (rear view)



5. Tighten the thumbscrew using a #2 Phillips-head screwdriver.
6. Go to **"Powering On an WLC"** .

Replacing a Power Supply

1. Remove the power cord from the power supply.
2. Loosen the thumbscrew using a #2 Phillips-head screwdriver.
3. Use the handle to pull the power supply partway out of the slot as shown in Figure 2–5.

Support the bottom of the power supply while removing it from the WLC. If the rear of the power supply is not supported, the supply will fall when you remove it, possibly damaging the rear components of the supply.

4. Place your other hand under the supply to support it and remove the supply the rest of the way out of the slot.

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5. Go to step 3 of **“Installing a New Power Supply”** .

Replacing the Fan Tray (WLC2800 Only)

The fan unit on the WLC2800 is not hot-swappable. Do not remove the fan tray while the unit is on. The system will overheat and result in a loss of equipment functionality or permanent damage.

An WLC2800 is shipped with a fan tray containing three fans that supply cooling air to the chassis. The fan tray is located at the rear left of the chassis and is connected to the main board with a blind mate connector. If a single fan fails, the WLC2800 can operate temporarily on two of the three fans units but the system software will log the following error.

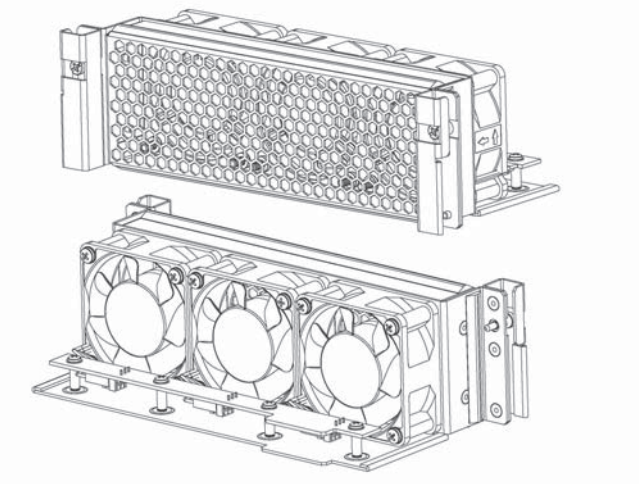
```
SYSLOGD Jan 10 16:01:38.728537 ERROR Fan 1 is stalled
```

As soon as a fan failure error appears, you should order a Fan Module Field Replacement Unit (FRU). Do not operate the WLC2800 if more than one fan fails.

Ordering a Fan Module Field Replaceable Unit (FRU)

The ordering information for the FRU is located on a label on the left handle of the Fan Module. Contact the Juniper Networks Technical Assistance Center (TAC) by telephone, e-mail, or via web support portal and order the **WLC2800-FAN**.

Figure 2–4. Front and Rear view of the FRU



Use the following procedure to replace the fan tray:

1. Remove the FRU from the packaging. Check to see that no debris or packing material is on or inside the module.
2. Power down the WLC2800.

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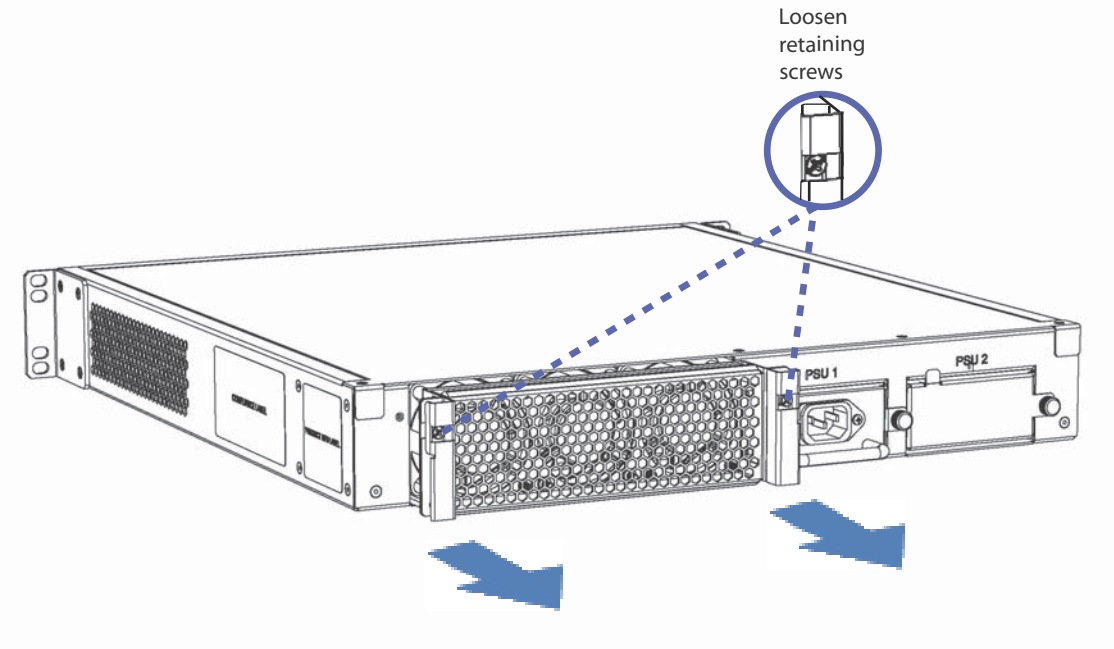
3. Loosen the retaining screws on each side of the fan tray using a #2 Phillips-head screwdriver.



4. Use the handles on either side of the fan tray to pull the tray out of the slot. Set used fan tray aside.
5. Use two hands to line up the FRU with the slot in the chassis and insert the FRU using firm but gentle pressure. You will feel the module settle when it is fully seated and flush against the chassis.

It is possible to insert the FRU into the chassis at an incorrect angle causing the unit to become wedged in the slot, so be sure to carefully align the FRU before insertion.

The fan unit is keyed so that the module will not fit into the slot if it is upside down. The connector must be on the bottom as you insert the unit.

---

6. Tighten the two retaining screws using a #2 Phillips-head screwdriver.
7. Power up the unit to ensure all three fans in the fan tray are operational.
8. Put the failed fan tray unit in the box the FRU was received in and ship the failed unit back to Juniper Networks.

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Powering On an WLC

The WLC relies on the building's installation for overcurrent protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15 A U.S. (240 VAC, 10 A international) is used on the phase conductors.

If an WLC2 or WLC8 is connected to Power Sourcing Equipment (PSE), it is possible for the WLC to remain powered on even when the power cord is unplugged. PSE can be a dedicated PoE injector or even another networking WLC such as the WLC that is capable of supplying PoE. To completely power off an WLC2 or WLC8, unplug the power cord, then unplug all Ethernet cables that are connected to other PoE devices.

Powering On an WLC8, WLC200, WLC800, WLC88R or WLC2800

To power on an WLC8, WLC200, WLC800, WLC880R or WLC2800:

1. Make sure any insertable power supply is fully seated in the WLC.
2. For each power supply that you are using on the WLC, attach a power cord to an AC power source.

If the WLC has two power supplies, use a separate AC power source for each supply to add redundancy. If one power source fails, the WLC can continue to operate using the other power source.

3. Plug each power cord into an WLC power supply.

   The WLC begins booting as soon as you plug in the power cord(s).

4. Observe the power supply LED for each connected power supply to verify that the LED is steadily glowing green. This indicates normal power supply operation.

Powering On an WLC2

To power on an WLC2:

1. Plug the power supply into an AC power source.
2. Plug the power supply into the Power port.

   The LED turns green when the WLC2 is receiving power.

Connecting to a Serial Console Port

Initial configuration of the WLC requires a connection to the WLC's CLI through the serial console port.

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Serial Console Cable

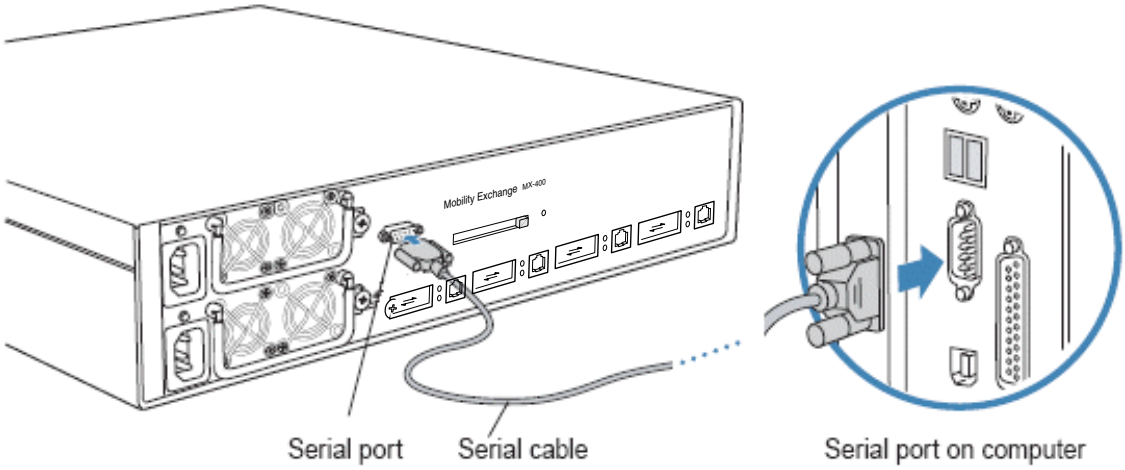
The serial console port has a female DB-9 connector and supports the EIA-232D signaling standard. You need a standard DB-9-male-to-9-female PC modem cable. The following table lists the pin signals.

Table 2– 3. Serial Console Cable

WLC Pin	Usage	PC Pin	Usage
2	Receive	3	Transmit
3	Transmit	2	Receive
5	Ground	5	Ground

Figure 2–5 shows how to install a serial cable on an WLC2, WLC8, WLC800, WLC880R or WLC2800. Refer to this figure as you perform the procedure. (For cable requirements, see **"Network Cables"** .)

Figure 2–5. Serial Cable Installation



To connect a PC to the serial console port:

1. Connect the serial cable to the PC port as shown in Figure 2–5.
2. Connect the other end of the cable to the serial console port on the WLC as shown in Figure 2–5.
3. Start a standard VT100 terminal emulation application on the PC, and configure the following modem settings:
   - 9600 bps
   - 8 bits
   - 1 stop
   - No parity
   - Hardware flow control *off* or *disabled*
4. Open a connection on a serial port.
   - If the WLC is already powered on, press Enter three times to display a command prompt:

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```
WLC200>
```

For simplicity, the command prompt examples in the documentation show the CLI access level (> for restricted access or # for enabled access) only. The default command prompt on your WLC shows your WLC's model number and also contains the last three octets of the WLC's MAC address. For example, the default command prompt on an WLC200 with MAC address 00:0B:0E:00:04:0A is *WLC200-00040A*>.

If a command prompt does not appear, go to **Troubleshooting a Serial Port Connection** below.

To quickly perform basic setup of the WLC, see the *Mobility System Software Quick Start Guide*.

For syntax descriptions, additional configuration, and a glossary of terms, see the *Mobility System Software Command Reference* and the *Mobility System Software Basic Configuration Guide*.

Troubleshooting a Serial Port Connection

1. Verify that the WLC is powered on.
2. Verify that the serial cable is fully connected to the PC and WLC ports.
3. Verify that the correct modem settings are configured in the terminal emulation application:
   - 9600 bps
   - 8 bits
   - 1 stop
   - No parity
   - Hardware flow control *off* or *disabled*
4. Verify that you opened the connection on the PC port connected to the WLC.

   For example, if you inserted the cable in PC port COM1, make sure you open the connection on COM1 instead of COM2 or another port.

If none of the previous steps results in a management connection, use another serial cable.

Connecting to the Network

Use the following procedures to connect an WLC to WLAs or other 10/100 Ethernet devices and to gigabit Ethernet devices.

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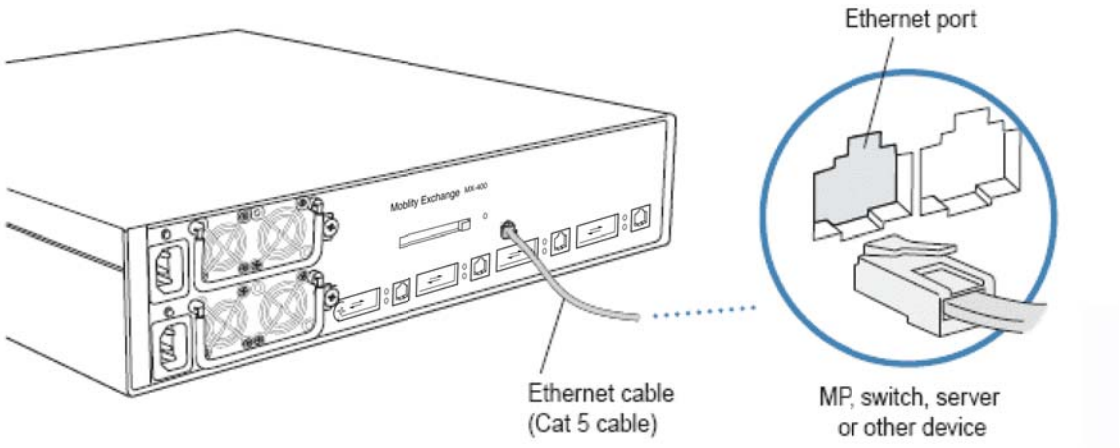
Connecting to a WLA or Other 10/100 Ethernet Device

The 10/100 Ethernet ports are configured as wired network ports by default. You must change the port type for locally connected WLAs, and for wired end stations that use AAA through the WLC to access the network.

For installations in Japan: Provide an earthing connection *before* you connect the mains plug to the mains. When disconnecting the earthing connection, make sure to disconnect only *after* you pull out the mains plug for the mains.

Figure 2–6 shows how to install a Cat 5 cable for a 10/100 Ethernet port. Refer to this figure as you perform the procedure.

Figure 2–6. 10/100 Cat 5 Cable Installation



To connect to a WLA or other 10/100 Ethernet device:

1. Insert a Cat 5 cable with a standard RJ-45 connector as shown in Figure 2–6:
   - For direct connection to a WLA, use a straight-through cable.
   - For connection to a router or to an end station such as a PC, printer, or server, use a straight-through cable.
   - For connection to another WLC, use a crossover cable. (For cable requirements, see “Network Cables” .)

The 10/100 Ethernet ports on the WLC8, WLC2, and WLC200s provide automatic MDI/MDX.

2. If the cable is directly attached to a WLA:
   - For a first-time installation, set the port type to activate the link. (For information, see “Setting the Port Type” in the *Mobility System Software Configuration Guide*.)

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- If the port type is already set for a WLA, observe the appearance of the WLA LED for the port:

WLA LED Appearance	Meaning
Solid green	For an WLA's active link, with PoE enabled, all the following are true: - WLA has booted. - WLA has received a valid configuration from the WLC. - Management link with an WLA is operational. For an WLA's secondary link, the link is present.
Alternating green and amber	WLA is booting with an image received from the WLC.
Solid amber	PoE is on, but no WLA is connected to the link.
Blinking amber	WLA is unresponsive or there is a PoE problem.
Unlit	PoE is off.

3. If the cable is attached to a wired end station that uses AAA through the WLC to access the network:
   - For a first-time installation, set the port type to activate the link. (For information, see "Setting a Port for a Wired Authentication User" in the *Mobility System Software Configuration Guide*.)
   - If the port type is already set for a wired authentication port, go on to step 4.
4. If the cable is directly attached to a device other than a WLA:
   a. Observe the appearance of the Link LED for the port:

Link LED Appearance	Meaning
Solid green	100-Mbps link is operational.
Solid amber	10-Mbps link is operational.
Blinking green	Traffic is active on the 100-Mbps link.
Blinking amber	Traffic is active on the 10-Mbps link.
Unlit	Link is not operational.

   b. If the Link LED is unlit, check the cable and verify that the device at the other end of the link is operating.

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Connecting to Gigabit Ethernet Devices

The gigabit Ethernet fiber-optic interfaces use Class 1 lasers. To reduce the risk of eye injury, do not stare into the interface or otherwise direct the laser beam into your eye.

Connecting to a Copper or SFP Gigabit Device (WLC2800)

Ports 1-8 on the WLC2800 can be either copper or SFP, the port should come up if you plug a cable into the copper port or an SFP into the SFP slot. If you plug in both at the same time, the copper port will be the primary connection by default.

If you want the SFP to take precedence, use the following CLI command:

```
# set port preference <port_num> sfp
```

Use the following command to change back to the default:

```
# clear port preference <port_num>
```

Connecting to a Fiber Gigabit Device (WLC200, WLC800 and WLC880R)

You must install a SFP to connect WLC200, WLC800, and WLC880R fiber ports to a 1000BASE-SX, 1000BASE-LX, or 1000BASE-TX cable (the WLC800 accepts only 1000BASE-SX and 1000BASE-LX cables).

Figure 2–7 shows how to install a SFP. Figure 2–8 shows how to remove one. Refer to these figures as you perform the procedures. (For cable requirements, see “Network Cables” .)

Figure 2–7. SFP Installation in WLC200

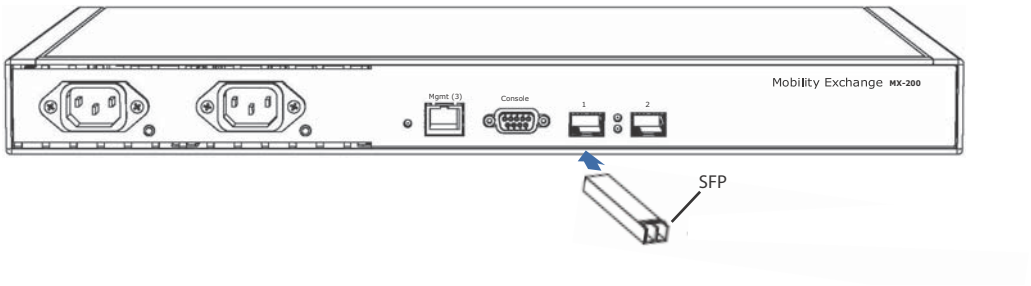
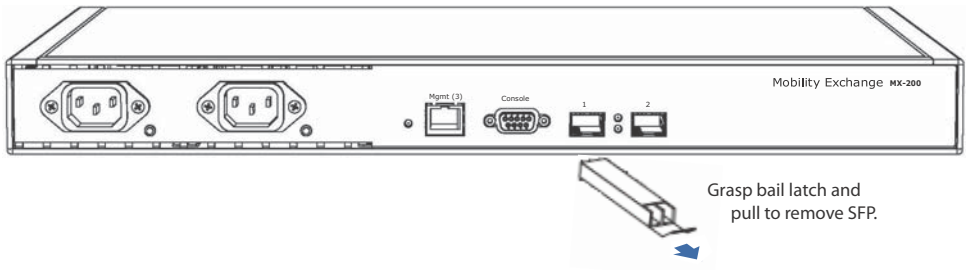


Figure 2–8. SFP removal from WLC200



To install a SFP:

1. Insert the SFP into a SFP slot on the front panel until it clicks into place.

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2. Remove the protective covering(s) from the port connector(s).
3. Insert the network cable.

For 1000BASE-SX or 1000BASE-LX fiber, make sure you insert the two cable ends in the proper sides (transmit or receive). Otherwise, the link does not work.

4. Observe the LED next to the SFP port:
   - If the LED is green, the 1000-Mbps link is operational..

For 1000BASE-SX or 1000BASE-LX fiber, the LED glows a solid green when the SFP receives a signal on its receive fiber even without the send fiber being attached. Check the other device's link status to ensure that the link is operational.

   - If the LED is unlit, the link is not operational. Check the cable and verify that the device at the other end of the link is operational.

To remove a SFP:

1. Remove the network cable(s).
2. Insert the protective covering(s) into the port connector(s).
3. Pull the bail latch on the SFP forward, away from the WLC, to unlock it from the front panel.
4. Grasping the bail latch, pull the SFP out of the slot.

Connecting to a Fiber XFP Transceiver (WLC2800)

1Gbps (1000Mbps) connectivity fiber SFPs must be used in ports 1 through 8, and 10Gbps connectivity XFPs must be used in ports 9 through 10 You must install an XFP to connect an WLC2800 to a 10G-BASE-SR or LR fiber cable.

Always use only Juniper Networks-qualified SFPs and XFPs. For a list of compatible SFPs and XFPs please refer to the Juniper Networks Pricelist at: http://www.juniper.net/.

Figure 2–9 shows how to install an XFP. Refer to this figure as you perform the procedures. (For cable requirements, see “Network Cables” .)

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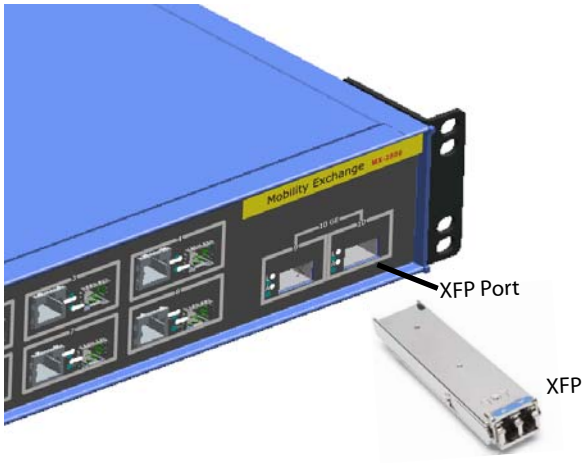
Figure 2–9. Installing an XFP



To install an XFP:

1. Insert the XFP into the appropriate slot on the front panel until it clicks into place.
2. Remove the protective covering(s) from the port connector(s).
3. Insert the network cable.

For 10GE-BASE-SR/LR fiber, make sure you insert the two cable ends in the proper sides (transmit or receive). Otherwise, the link does not work.

4. Observe the L (Link) LED next to the XFP port:
   - If the L LED is green, the 10000-Mbps link is operational.

For 10G-BASE-SR/LR fiber, the LED glows a solid green when the XFP receives a signal on its receive fiber even without the send fiber being attached. Check the other device's link status to ensure that the link is operational.

   - If the L LED is unlit, the link is not operational. Check the cable and verify that the device at the other end of the link is operational.

To remove an XFP:

1. Remove the network cable(s).
2. Insert the protective covering(s) into the port connector(s).
3. Pull the bail latch on the XFP, away from the WLC, to unlock it from the front panel.
4. Grasping the bail latch, pull the XFP transceiver out of the slot.

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Installing a WLC Gigabit Interface Converter

Use the following procedures to install or remove a gigabit interface converter (GBIC) in a WLC.

Installation must be performed by qualified service personnel only. Read and follow all warning notices and instructions marked on the product or included in the documentation. Before installing the product, read the *Regulatory Information* document.

The gigabit Ethernet fiber-optic interfaces use Class 1 lasers. To reduce the risk of eye injury, do not stare into the interface or otherwise direct the laser beam into your eye.

Cabling Requirements

The table below lists the gigabit Ethernet interface types supported by the WLC and the cable type required for each type of interface.

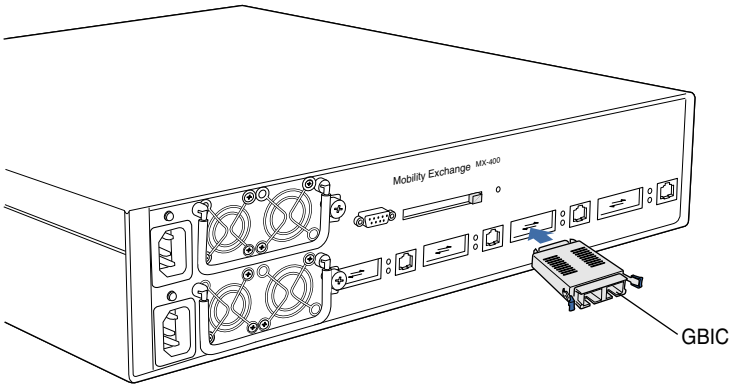
Table 2– 4. Gigabit Ethernet interfaces

Link type	Cable type	Connector type	Maximum distance
1000BASE-SX	Multimode 50-µm fiber	SC	550 meters (1804.5 feet)
	Multimode 62.5-µm fiber	SC	275 meters (902.2 feet)
1000BASE-LX	Single mode 9/10-µm fiber	SC	10000 meters (32808.4 feet)
	Multimode 50-µm fiber	SC	550 meters (1804.5 feet)
	Multimode 62.5-µm fiber	SC	550 meters (1804.5 feet)

Installing a New GBIC

The figure below shows how to install a GBIC. Refer to this figure as you perform the procedure.

Figure 2–10. GBIC installation



1. Insert the GBIC into a GBIC slot on the front panel until it clicks into place.
2. Remove the protective covering(s) from the port connector(s).

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3. Insert the network cable.

Note: For 1000BASE-SX or 1000BASE-LX fiber, make sure to insert the two cable ends in the proper sides (transmit or receive). Otherwise, the link does not work.

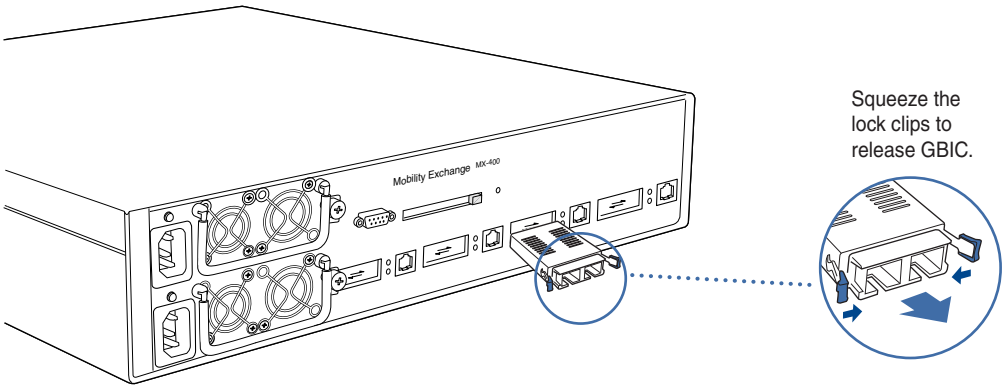
4. Observe the LED next to the GBIC port:
   - If the LED is green, the 1000-Mbps link is operational.

Note: For 1000BASE-SX or 1000BASE-LX fiber, the LED glows a solid green when the GBIC receives a signal on its receive fiber even without the send fiber being attached. Check the other device's link status to ensure that the link is operational.

   - If the LED is amber, traffic is active on the 1000-Mbps link.
   - If the LED is unlit, the link is not operational. Check the cable and verify that the device at the other end of the link is operational.

Replacing a GBIC

Figure 2–11. GBIC removal



1. Remove the network cable(s).
2. Insert the protective covering(s) into the port connector(s).
3. Squeeze the clips on the sides of the GBIC and pull the GBIC out of the slot.
4. Go to **“Installing a New GBIC” .**

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WLC Troubleshooting

The following table contains remedies for some common problems that can occur during basic installation and setup of an WLC.

Table 2– 5. WLC Setup Problems and Remedies

Symptom	Diagnosis	Remedy
RingMaster or a Web browser (if you are using Web View) warns that the WLC's certificate date is invalid.	The WLC's time and date are currently incorrect, or were incorrect when you generated the self-signed certificate or certificate request.	1. Use **set timezone** to set the time zone that you are operating the WLC. (See "Setting the Time Zone" in the *Mobility System Software Configuration Guide*.) 2. Use **set timedate** to configure the current time and date in that time zone. (See "Statically Configuring the System Time and Date" in the *Mobility System Software Configuration Guide*.) 3. Reconfigure the administrative certificate(s). (See "Creating Keys and Certificates" in the in the *Mobility System Software Configuration Guide*.) 4. If you have already configured a certificate on the WLC for authentication by network users, you must recreate this certificate, too.
WLC does not accept configuration information for a WLA access point or a radio.	The country code might not be set or might be set for another country.	1. Type the **show system** command to display the country code configured on the WLC. 2. If the value in the System Countrycode field is *NONE* or is for a country other than the one in which you are operating the WLC, use the **set system countrycode** command to configure the correct country code. (See "Specifying the Country of Operation" in the *Mobility System Software Configuration Guide*.)
Client cannot access the network.	This symptom has more than one possible cause:	
	☐ The client might be failing authentication or might not be authorized for a VLAN.	1. Type the **show aaa** command to check the authentication rules on the WLC, to ensure that the client can be authenticated. 2. Check the authorization rules in the WLC's local database (**show aaa**) or on the RADIUS servers to ensure the client is authorized to join a VLAN that is configured on at least one of the WLCs in the Mobility Domain.
	☐ If the client and WLC configurations are correct, a VLAN might be disconnected. A client connected to a VLAN that is disconnected is unable to access the network.	1. Type the **show vlan config** command to check the status of each VLAN. 2. If a VLAN is disconnected (VLAN state is Down), check the network cables for the VLAN's ports. At least one of the ports in a VLAN must have a physical link to the network for the VLAN to be connected.
Configuration information disappears after a software reload.	The configuration changes were not saved.	1. Retype the commands for the missing configuration information. 2. Type the **save config** command to save the changes.
Mgmt LED is quickly blinking amber. CLI stops at boot prompt (boot>).	The WLC was unable to load the system image file.	Type the **boot** command at the boot prompt.

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WLC Technical Specifications

The following tables list the technical specifications for all outdoor WLC models. For detailed compliance information, see the *Regulatory Information* document at http://www.juniper.net/techpubs/en_US/release-independent/wireless/information-products/topic-collections/wireless-lan/hardware/regulatory-info.pdf.

Table 3– 1. WLC2800 Mechanical and Compliance Specifications

Specification	Description
Size	Width: 44.2 centimeters (17.4 inches) Depth: 45.72 centimeters (18 inches) Height: 6.58 centimeters (2.59 inches)
Weight	8.1 kilograms (18 lbs) with one power supply 8.77 kilograms (19.5 lbs) with 2 power supplies
Operating Temperature	0°C to 40°C (0° F to +104° F)
Storage Temperature	-40°C to 70°C (-40° F to +158° F)
Humidity	10% - 95% (non-condensing)
Power supply	Input: 100-240 VAC, 50-60 Hz, auto-sensing
Power over Ethernet	N/A
Status indicators	Power supply status LED Port activity and link speed LEDs
Wired network ports	8 x gigabit Ethernet Small Form-Factor Pluggable (SFP) ports 8 x gigabit Ethernet RJ45 ports 2x 10 gigabit Ethernet Small Form-Factor Pluggable (XFP) ports
Safety and electromagnetic compliance	Regulatory Safety: ❑ UL 60950-1 ❑ CSA 22.2 NO. 60950-1 EMI/EMC: ❑ FCC PART 15 Class A ❑ ICES Class A ❑ EN 55022 Class A ❑ EN 55024 ❑ CISPR 22 Class A Environmental: ❑ EN Directive 2002/95/EC: RoHS (Restriction of the use of certain hazardous substances in electrical and electronic equipment) ❑ EN Directive 2003/108/EC: WEEE (Waste of electrical and electronic equipment)

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Table 3– 2. WLC800 and WLC880R Mechanical and Compliance Specifications

Specification	Description
Size	Width: 44 centimeters (17.32 inches) Depth: 37.54 centimeters (14.78 inches) Height: 4.42 centimeters (1.74 inches)
Weight	5.26 kilograms (11.6 lbs)
Operating Temperature	0°C to 40°C (0° F to +104° F)
Storage Temperature	-40°C to 70°C (-40° F to +158° F)
Humidity	10% - 90% (non-condensing)
Power supply	Input: 100-240 VAC, 50-60 Hz, auto-sensing
Power over Ethernet (PoE)	N/A
Status indicators	Power supply status LED Port activity and link speed LEDs
Wired network ports	4 x gigabit Ethernet Small Form-Factor Pluggable (SFP) ports 4 x 10/100/1000Mbps Ethernet RJ45 ports
Safety and electromagnetic compliance	Regulatory Safety: ❑ CB Scheme report against IEC 60950-1 Edition 1 (2001) with all country deviations and Common Modifications per CB Bulletin 107A (May 2004) ❑ IEC 60950-1 ❑ UL 60950-1 ❑ CSA 22.2 NO. 60950-1-03 EMI/EMC: ❑ FCC PART 15 Class A ❑ ICES Class A ❑ VCCI Class A ❑ EN 55022 Class A ❑ EN 55024 ❑ EN 60601-1-2 ❑ CISPR 22 Class A ❑ Taiwan: NS 13438 Class A ❑ China: CCC GB 9254-88 Class A ❑ Australia/New Zealand: AS/NZ 3548 Class A Environmental: ❑ EN Directive 2002/95/EC and 2006/122/EC: RoHS (Restriction of the use of certain hazardous substances in electrical and electronic equipment) ❑ EN Directive 2002/96/EC: WEEE (Waste of electrical and electronic equipment) ❑ Battery Directive 2006/66/EC

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Table 3– 3. WLC200 Mechanical and Compliance Specifications

Specification	Description
Size	Width: 44.2 centimeters (17.4 inches) Depth: 30.7 centimeters (12.1 inches) Height: 4.4 centimeters (1.72 inches)
Weight	WLC200: ❑ With one power supply: 4.54 kilograms (10.0 pounds) ❑ With two power supplies: 4.99 kilograms (11.0 pounds)
Operating Temperature	0° C to +50° C (32° F to +122° F)
Storage Temperature	-20° C to +70° C (-4° F to +158° F)
Humidity	10% to 95% noncondensing
Power supply	WLC200: 150-240 VAC 50 Hz to 60 Hz 1 A_{rms} at 120 VAC and 0.51 A_{rms} at 230 VAC 17 A max. at 120 VAC and 32 A max. at 230 VAC
Status indicators	Management CPU status LED Power supply status LEDs Port activity and link speed LEDs
Wired network ports	WLC200: ❑ Two SFP slots for 1000BASE-SX, 1000BASE-LX, or 1000BASE-TX gigabit Ethernet ports ❑ One RJ-45 port for 10/100BASE-T Ethernet (without PoE) used for out-of-band management
Safety and electromagnetic compliance	Regulatory Safety: ❑ UL 60950-1 ❑ CSA 22.2 NO. 60950-1 EMI/EMC: ❑ FCC PART 15 Class A ❑ ICES Class A ❑ VCCI Class A ❑ EN 55022 Class A ❑ EN 55024 ❑ CISPR 22 Class A ❑ Taiwan: CNS 13438 Class A ❑ China: CCC GB 9254-88 Class A ❑ Australia/New Zealand: AS/NZ 3548 Class A Environmental: ❑ EN Directive 2002/95/EC: RoHS (Restriction of the use of certain hazardous substances in electrical and electronic equipment) ❑ EN Directive 2003/108/EC: WEEE (Waste of electrical and electronic equipment)

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Table 3– 4. WLC8 Mechanical and Compliance Specifications

Specification	Description
Size	Width: 44.2 centimeters (17.4 inches) Depth: 25.6 centimeters (10.08 inches) Height: 4.4 centimeters (1.72 inches)
Weight	Without a power supply: 3.40 kilograms (7.50 pounds) With one power supply: 3.8 kilograms (8.50 pounds) With two power supplies: 4.3 kilograms (9.50 pounds)
Operating Temperature	0° C to +50° C (32° F to +122° F)
Storage Temperature	-20° C to +70° C (-4° F to +158° F)
Humidity	10% to 95% noncondensing
Power supply	100-120 VAC / 200-240 VAC 47 Hz to 63 Hz 2.5 A_{rms} at 115 V_{rms} and 1.25 A_{rms} at 230 V_{rms}, with 70-A peak inrush current
Power over Ethernet (PoE)	48 VDC 91.8 W total budget for all ports (15.3 W * 6 ports) 15.3 W per port maximum
Status indicators	Power supply status LEDs Port activity and link speed LEDs.
Wired network ports	Six RJ-45 ports for 10/100BASE-T Ethernet and optional Power over Ethernet (PoE) Two RJ-45 ports for 10/100BASE-T Ethernet uplinks (without PoE)
Safety and electromagnetic compliance	FCC PART 15, UL 60950 ICES PART 15, CSA 22.2 NO. 60950 EN 55022, EN 55024 CISPR 22 TUV/GS (EN 60 950) VCCI

Table 3– 5. WLC2 Mechanical and Compliance Specifications

Specification	Description
Size	Width: 19.0 centimeters (7.5 inches) Depth: 14.6 centimeters (5.75 inches) Height: 3.18 centimeters (1.25 inches)
Weight	0.7 kilograms (1.5 pounds)
Operating Temperature	0° C to +50° C (32° F to +122° F)
Storage Temperature	-20° C to +70° C (-4° F to +158° F)
Humidity	10% to 95% noncondensing
Power supply	Input: 100-240 VAC, 47-63 Hz, auto-sensing Output: 48 VDC, 0.83A Amperage draw maximums: At 115V (RMS): 0.8A At 230V (RMS): 0.4A
Power over Ethernet (PoE)	Voltage output: 48 VDC Wattage on port: 15.4 W

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Table 3– 5. WLC2 Mechanical and Compliance Specifications (continued)

Specification	Description
Status indicators	Power supply status LED Port activity and link speed LEDs Factory reset LED
Wired network ports	One RJ-45 port for 10/100BASE-T Ethernet and optional Power over Ethernet (PoE) One RJ-45 10/100BASE-T Ethernet uplink (without PoE)
Safety and electromagnetic compliance	FCC PART 15 Class B, UL 60950-1 ICES Class B, CSA 22.2 NO. 60950-1 EN 55022 Class B, EN 55024, EN 60950-1 EN 60101-1-2 EU Medical Directive CISPR 22 Class B VCCI Class B

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